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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,833	11/12/2003	Mark R. Fernald	CC-0676	9515

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EXAMINER	
WASHBURN, DOUGLAS N	
ART UNIT	**PAPER NUMBER**
2863	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/712,833	FERNALD ET AL.	
	Examiner	Art Unit	
	Douglas N. Washburn	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,9,11-25,27 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,9,11-25,27 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

1 The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 9, 11-25 27 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Gysling et al. (US 2004/0069069) (Hereafter referred to as Gysling).

Gysling teaches:

An apparatus (probe; ¶ 0055; figure 3) for measuring at least one parameter of a process flow flowing within a pipe ("sense and determine specific characteristics or parameters of a single phase fluid 12 and/or a multi-phase mixture 12 flowing through a pipe (conduit)"; ¶ 0055) in regard to claim 1;

At least two strain sensors attached onto an outer surface of a pipe at different axial locations along the pipe ("an array of pressure sensors (or transducers) 18-21 spaced axially along the outer surface 22 of the tube"; ¶ 0056), each strain sensor providing a respective strain signal indicative of a pressure disturbance within the pipe ("The pressure sensors measure the unsteady pressures produced by acoustical and/or vortical disturbances within the tube, which are indicative of a parameter of the single phase fluid or multiphase mixture 12."; ¶ 0056) at a corresponding axial position ("each measuring an unsteady pressure within the bore at a corresponding axial location, each of said sensors providing a pressure signal indicative of the unsteady pressure within the bore at said axial location of a corresponding one of said sensors"; claim 1), each of the strain sensors comprising piezoelectric film material having a pair of conductors disposed on opposing surfaces of the piezoelectric material ("a piezoelectric film sensor (similar to the sensor 18 of FIG. 1), wherein the piezoelectric film 32 is disposed between and pair of conductive coatings 34,35, such as silver ink. The piezoelectric film 32 and conductive coatings 34,35 are coated onto a protective sheet 36 (e.g., mylar) with a protective coating 38 disposed on the opposing side of the upper conductive coating. A pair of conductors 40,42 is attached to a respective conductive coating 34,35."; ¶ 0077) in regard to claim 1;

A signal processor ("processing unit 24, which processes the pressure measurement data and determines at least one parameter of the mixture."; ¶ 0056; figures 2 and 3), responsive to strain signals, which provides a signal indicative of at least one parameter of a process flow flowing within a pipe in regard to claim 1;

A process flow is one of a single phase fluid and a multi-phase mixture (single phase fluid 12 and/or a multi-phase mixture 12 flowing through a pipe (conduit)"; ¶ 0055) in regard to claim 3;

A piezoelectric film material includes at least one of polyvinylchlorine fluoride (PDVF), polymer film and flexible PZT ("The sensors can be formed from PVDF films, co-polymer films, or flexible PZT sensors"; ¶ 0075) in regard to claim 9;

Each pair of conductors is a coating of silver ink ("the piezoelectric film 32 is disposed between and pair of conductive coatings 34,35, such as silver ink"; ¶ 0077) in regard to claim 11;

A piezoelectric film material extends around a substantial portion of the circumference of a pipe ("The piezoelectric film sensors 30 wrapped around the outer wall of the tube"; ¶ 0074) in regard to claim 12;

A piezoelectric film material has a thickness greater than 8 mm ("The thickness of the piezoelectric film 32 may be in the range of 20 um to approximately 100 um."; ¶ 0078) in regard to claim 13;

A piezoelectric film material has a thickness between 8 mm and 120 mm (The thickness of the piezoelectric film 32 may be in the range of 20 um to approximately 100 um."; ¶ 0078) in regard to claim 14;

An apparatus (probe; ¶ 0055; figure 3) for measuring at least one parameter of a process flow flowing within a pipe ("sense and determine specific characteristics or parameters of a single phase fluid 12 and/or a multi-phase mixture 12 flowing through a pipe (conduit)"; ¶ 0055) in regard to claim 15;

At least two strain sensors attached onto the outer surface of a pipe at different axial, locations along the pipe ("an array of pressure sensors (or transducers) 18-21 spaced axially along the outer surface 22 of the tube"; ¶ 0056), each of strain sensor providing a respective strain signal indicative of a pressure disturbance within the pipe ("The pressure sensors measure the unsteady pressures produced by acoustical and/or vortical disturbances within the tube, which are indicative of a parameter of the single phase fluid or multiphase mixture 12."; ¶ 0056) at a corresponding axial position ("each measuring an unsteady pressure within the bore at a corresponding axial location, each of said sensors providing a pressure signal indicative of the unsteady pressure within the bore at said axial location of a corresponding one of said sensors"; claim 1), each of the strain sensors comprising piezoelectric film material having a pair of conductors disposed on opposing surfaces of the piezoelectric material ("a piezoelectric film sensor (similar to the sensor 18 of FIG. 1), wherein the piezoelectric film 32 is disposed between and pair of conductive coatings 34,35, such as silver ink. The piezoelectric film 32 and conductive coatings 34,35 are coated onto a protective sheet 36 (e.g., mylar) with a protective coating 38 disposed on the opposing side of the upper conductive coating. A pair of conductors 40,42 is attached to a respective conductive coating 34,35."; ¶ 0077) in regard to claim 15;

An electrical insulator disposed between each sensor and a pipe ("The housing protects the array of sensors 18-21 disposed along the tube from the flow 12, and also acts as an insulator"; ¶ 0066) and a signal processor ("processing unit 24, which processes the pressure measurement data and determines at least one parameter of the mixture."; ¶ 0056; figures 2 and 3), responsive to strain signals, which provides a signal indicative of at least one parameter of the process flow flowing within the pipe in regard to claim 15;

Strain signals are indication of acoustic pressures propagating within a pipe ("The pressure sensors measure the unsteady pressures produced by acoustical and/or vortical disturbances within the tube, which are indicative of a parameter of the single phase fluid or multiphase mixture 12"; ¶ 0056) in regard to claim 16;

A parameter of a fluid is one of steam quality or "wetness", vapor/mass ratio, liquid/solid ratio, volumetric flow rate, mass flow rate, size of suspended particles, density, gas volume fraction, and enthalpy of the flow ("determine any one of a plurality of parameters of the flow, such as the steam quality or "wetness", vapor/mass ratio, liquid/solid ratio, the volumetric flow rate, the mass flow rate, the size of the suspended particles, and the enthalpy of the flow."; ¶ 0055) in regard to claim 17;

A signal processor determines the slope of an acoustic ridge in the k-ω plane to determine a parameter of the process flow flowing in the pipe ("the convective velocity of turbulent eddies, and hence flow rate within a tube, can be determined by constructing a k-ω plot from the output of a phased array of sensor and identifying the slope of the convective ridge."; ¶ 0202) in regard to claim 18;

Strain signals are indicative of vortical disturbances within a fluid flow ("Flexible piezoelectric sensors can be mounted in a variety of configurations to enhance signal detection schemes. These configurations include a) co-located sensors, b) segmented sensors with opposing polarity configurations, c) wide sensors to enhance acoustic signal detection and minimize vortical noise detection, d) tailored sensor geometries to minimize sensitivity to tube modes, e) differencing of sensors to eliminate acoustic noise from vortical signals."; ¶ 0083) in regard to claim 19;

A parameter of a fluid is one of velocity of a process flow and a volumetric flow of the process fluid ("Mass flow rates and other parameters are determined by measuring the speed of sound propagating within the process mixture 12. These parameters are determined by correlating unsteady pressure variations created by acoustic disturbances within the process mixture."; ¶ 0100) in regard to claim 20;

A signal processor determines the slope of a convective ridge in the k-ω plane to determine the velocity of the fluid flowing in the pipe ("the convective velocity of turbulent eddies, and hence flow rate within a tube, can be determined by constructing a k-ω plot from the output of a phased array of sensor and identifying the slope of the convective ridge."; ¶ 0202) in regard to claim 21;

A signal processor determines the volumetric flow rate of the fluid flowing in the pipe in response to the-velocity of the fluid ("the convective velocity of turbulent eddies, and hence flow rate within a tube, can be determined by constructing a k-ω plot from the output of a phased array of sensor and identifying the slope of the convective ridge."; ¶ 0202) in regard to claim 22;

A signal processor generates a flow velocity signal indicative of the velocity of a fluid flowing within a pipe by cross-correlating strain signals ("Mass flow rates and other parameters are determined by measuring the speed of sound propagating within the process mixture 12. These parameters are determined by correlating unsteady pressure variations created by acoustic disturbances within the process mixture."; ¶ 0100) in regard to claim 23;

Each sensor measures an acoustic pressure and provides a signal indicative of an acoustic noise within a pipe ("each sensor measures an acoustic pressure and provides a signal indicative of an acoustic noise"; claim 2) in regard to claim 24;

An apparatus comprising at least three of said strain sensors (figure 8) in regard to claim 25;

Strain sensors are mounted to the outer surface of a pipe by an adhesive ("The piezoelectric film sensors may be mounted directly onto the outer diameter of the tube 14 by epoxy, glue or other adhesive"; ¶ 0085) in regard to claim 27;

> And strain sensors include pressure sensors (the pressure sensors, including electrical strain gages, optical fibers and/or gratings among others as described herein, may be attached to the tube by adhesive, glue, epoxy, tape or other suitable attachment means to ensure suitable contact between the sensor and the tube"; ¶ 0208) in regard to claim 28.

Conclusion

2 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas N. Washburn whose telephone number is (571) 272-2284. The examiner can normally be reached on Monday through Thursday 6:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DNW

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